

Toyota Kohki Co., Ltd., Tokio, 183-0035 Japan

# Laying Blocks for Aquatic Organisms and Environment Protection

Since its foundation of 1966, Toyota Kohki Co., Ltd. has been developed its technologies and contributed to the concrete industry as a leading mould manufacturing company for precast concrete products in Japan. Each Toyotaforms is custom made to meet individual customer's requests. Various types of precast concrete products in Japan have been shown in CPI and how Toyota Kohki has contributed to the product development as mould professionals. In this issue an advanced type of precast concrete product is presented.



Fig. 1 a, b: River-development in the environmentally and eco-friendly-way

In the infrastructure industry of Japan at postwar years of spectacular economic growth, Japan rapidly enhanced river improvement projects as a priority element for security and economy. As a result, river environment had become artificial and colorless landscape. Based on reflection on this experience, Ministry of Land, Infrastructure, Transport, and Tourism Govern-

ment of Japan regulated "principle of nature-oriented river limprovement" which purposes on river-development in the environmentally and eco-friendly-way, and brings out the power of the nature. In this issue, laying type concrete block products will be introduced which provide both for protection for aquatic organisms and for revetment function.

As Japan has many torrential rivers and steep slope of river revetment, Laying Blocks have been in heavy usage. However, Laying Blocks, are considered as difficult for vegetation and ecosystem integrity, and artificially constructed landscape.

Fig. 2a and Fig. 2b are construction examples of a newly developed laying-block. This is a combination of two different



Fig. 2a, b, c: Block examples which enhance the function for both revetment and eco-friendly.



Fig. 3a, b

blocks, that each has different shapes for different purposes. The top block, called "Verdure Block" is for vegetation while the bottom block, called "Fish-Shelter Block", is designed for protecting aquatic organisms.

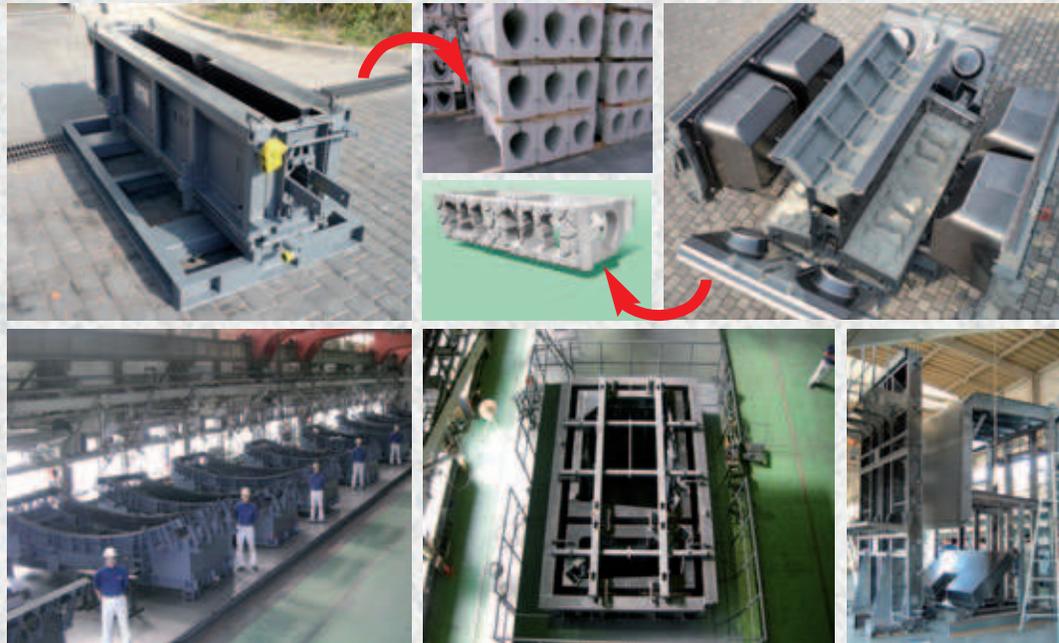
As to see in Fig 2c fishes are settled in the spaces.

Fig. 3a and Fig. 3b show another type of Fish-House Type Blocks, called "Bio-Tone Block". Fig. 3a is the picture of the con-

struction side and Fig. 3b shows the same place after years. As to see, the concrete block parts are completely covered with vegetation and fit in with the surrounding landscape. Bio-Tone block can be used for

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Fig. 4a, b, c, d

both vegetation and organism house. Fig. 4a - 4d are showing a product named "Breed Rock". This block is laid in 1:2 gradients, and has a design of ramp, which enables organisms to climb up from river. This design is also well-considered for small animals (even the slow moving organisms, such as turtles and snakes) to move in transverse direction as well. Of course human can also escape from river in case of falling into river.

The products introduced above can be used undersurface or onshore case by case. The product can be filled with rocks normally when they are laid on the undersurface and with soils for vegetation. It is also possible to lay up the different block types together for making a unique combination design. It is normally required to manufacture in large quantity for these type products. Manufacturing at low price is key issue for

manufacturers. At the same time, these are also required to make the each block in the same dimensions because the method of construction is with laying up piece by piece. Irregularity in size naturally will cause construction problems. These matters are greatly influenced by the quality of the mould. The accuracy of mould equals to the accuracy of concrete product. The quality of moulds also greatly influences the efficiency and productivity. That is, a mould plays a crucial role of manufacturing pre-cast concrete products. Further, the quality of concrete product influences on the quality and productivity at construction site.

FURTHER INFORMATION



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Fig.5a: Mould for Breed Rock



Fig. 5b: Mould for Breed Rock